Two New Grading Options: Scaling and Importance

Robert S. Todd,
Ernest C. Trefz School of Business, University of Bridgeport, Bridgeport, CT
rtodd@bridgeport.edu

Abstract

Two new tools for adjusting student grades to more accurately reflect the nuances of student performance, to account for misjudgments in the design of assignments, and to account for the effects of "too-easy" or "too-demanding" grading are introduced. These are called *scaling* and *importance*. They are defined and their effects are illustrated.

What Does It Mean To "Grade Fairly?"

1. We're grading fairly if we accurately report a student's accomplishments to both the student and the outside world.

2. "Accurately" includes (at least)…
…adjustments for the instructor's misjudgment of the ease or difficulty of an assignment.

…adjustments for the relative importance of different assignments.

3. "Accomplishments" include…
…each student's mastery of the material.

…each student's progress toward becoming a contributing citizen of society, including his attitude, work ethic, and communication skills.

4. "The outside world" includes both a student's immediate world of work and family and the larger world of society in general.

Relative vs. Absolute Grading

1. Relative grading means relative to others in the class. The highest grade is an A and the lowest grade is an F, regardless of the ease or difficulty of an assignment. The others are distributed in some way between A and F.

2. Absolute grading means relative to an appropriate external standard. Absolute grading does not guarantee any grade distribution and depends sensitively on the instructor's ability to design an appropriate assignment, as well as his ability to accurately evaluate each student's progress toward that standard.

3. Both methods have drawbacks, the chief of which is the assignment of a categorical (letter) grade rather than a more delicately nuanced numeric grade.

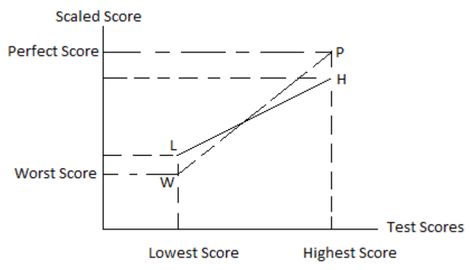
Curving and Weighting:

1. The "curve" is, historically, the Normal Distribution. Scores that are 1.5 standard deviations above average receive an A, and so on. In practice, "curving" means "give everybody extra points."

2. Weighting involves counting some assignments more than once when calculating a final average.

Scaling…

1. Scaling is akin to curving, but is computationally different in that the grade distribution is linearly scaled from a "worst" to "perfect" scale.



The scaled score is calculated as follows.

$$SS = (P-W)(S-L)/(H-L) + W$$

where SS is the scaled score, S is the raw score, and P, W, H, and L have the meanings above.

There are 9 different ways "Perfect" and "Worst" can be chosen, each producing a different result.

If P = H and W = L, then there is no effect.

If P = 100 and W = L, then the lowest grade remains what it was, the highest grade becomes 100, and the others are raised proportionally.

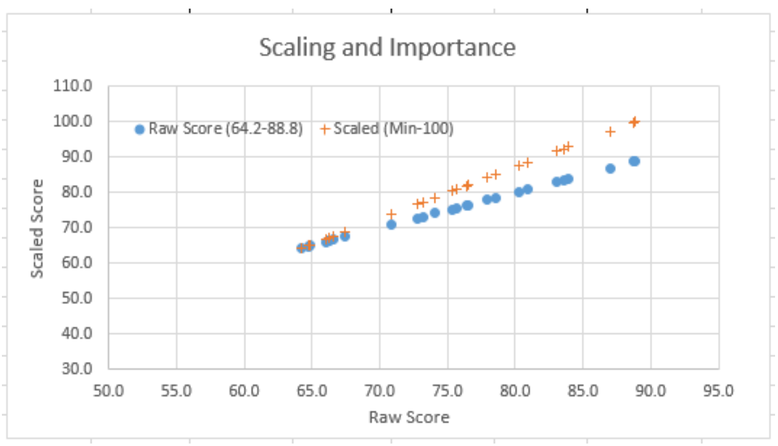
If P = 100 and W = 55, then the highest grade is raised to 100, the lowest grade is either raised or lowered to 55, and all the others are adjusted proportionally.

…and Importance

1. Importance is akin to weighting, but can be applied to a single assignment. If desired, an "important" assignment can also be weighted more heavily when calculating a final average.

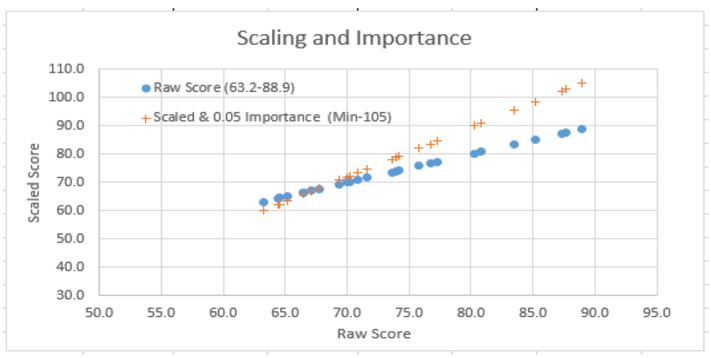
2. To say that an assignment is "important" means that doing well should result in a somewhat higher score *and* that doing poorly should result in a somewhat lower score.

Illustrations of Scaling and Importance

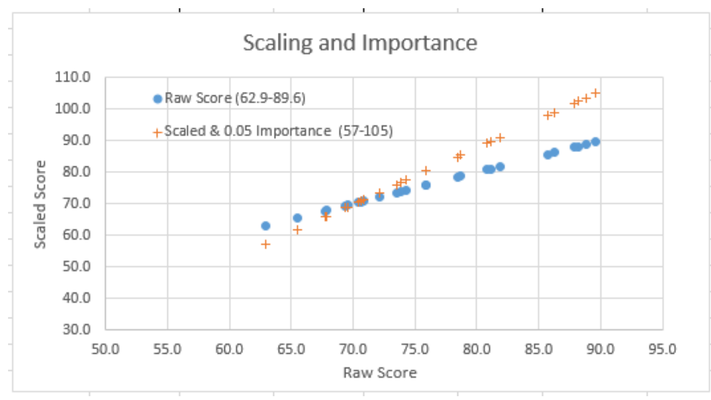


Effect of scaling from Low to Perfect

More Illustrations:



Effect of scaling from Low to Perfect plus a 5% Importance factor



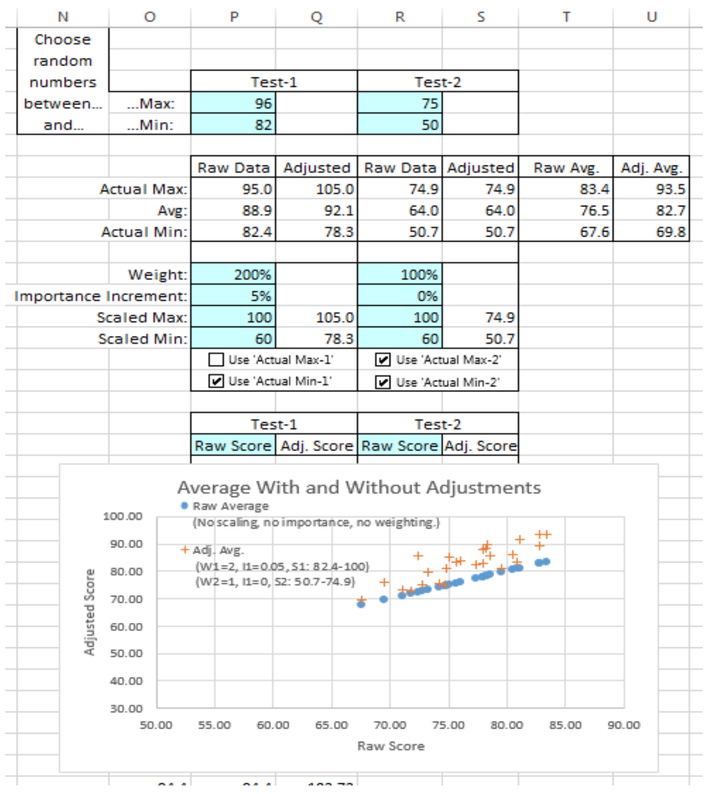
Effect of scaling from Worst to Perfect plus a 5% Importance factor

Implementation:

1. The computational requirements of scaling and importance can be made trivial with a spreadsheet.

2. The user enters student scores, chooses weights, importance and scaling parameters, and the spreadsheet does all the donkey work.

3. The example shown is but one of many, many possibilities.



Summary:

1. The concepts of scaling and importance, implemented in a spreadsheet, can aid an instructor in grading as he feels most accurately reflects the nuances of student performance.

2. I will happily share an actual grading spreadsheet that implements these ideas, as well as the previous poster's CGPA grading, with anyone who wishes to experiment with these ideas.